

Appendix B

Current Monitor

The Evolution DX2 series controller provides the ability to limit and view the controller's output current (Amps) usage. Establishing limits allows detection of field wiring problems associated with any station. Evolution DX2 current monitoring features include:

- Display of the total, instantaneous current on a per station basis
- Automatic termination of station output and reporting of station status when the preset maximum current is exceeded
- Automatic termination of station output and reporting of station status when current stays below the pre-set minimum
- Review of station status reports via the Warning/Alarm display
- Automatic current limit setup

Current Monitor Setup

The monitoring of current can be enabled or disabled. Even if it is disabled, the controller ensures that the maximum total current will not exceed 2 Amps. At this point the controller may shut down.

Special test circuits automatically check and calibrate the current monitor during start-up to ensure optimum accuracy.

Warning:**To properly monitor current levels:**

- You must enter minimum and maximum current levels to be monitored by the system.
- When setting limits, the controller automatically sums limits when multiple stations and/or the Master Valve are on. For example, assume station 1 has a .2 Amps limit and the Master Valve has a .4 Amps limit. When both are on, the controller adds $(.2 \text{ Amps}) + (.4 \text{ Amps}) = .6 \text{ Amps}$. The measured value is then compared to .6 Amps.
- Current monitoring must be *enabled*.

Current Limit Detection

When a current limit is detected, the controller performs the following actions:

1. If the limit is for a station, operation of the station is immediately terminated.
2. The problem is listed as a warning/alarm.
3. The controller advances to the next station in the current program (if applicable).
4. The station is entered in a "condemned" list. No watering occurs for those stations in the "condemned list" until the problem is corrected.

To remove a station from the bad list, delete the problem from the warning report, refer to Chapter 10.

F1	=FLOW ONLY	F2	=CURRENT ONLY	↑
F3	=BOTH FLOW AND CURRENT			

Figure 186: Auto Limits

There are three options:

- Flow Only
- Current Only
- Both Flow and Current

Step 3 Select F2=CURRENT ONLY and enter the station number. The station number must be between 1 and 48. To measure all stations, enter station number 1, and then press ENTER.

Note: *The maximum number of stations is determined by the total stations installed in the satellite. The maximum number (1-xx) will appear on the Station Number Entry Display.*
The following resultant display indicates the station number, run-time count-down timer, station current measurement (I) and flow measurement (GPM).
The upper and lower limits of current are automatically calculated based on the measured parameters.
The current measuring default time is 5 seconds for each station. When the count-down clock runs down, the station number will increment to the next station and the measurement process is repeated.
With all stations completed, the display returns to the Auto Limits Options menu. At this point, all upper and lower percentage values are calculated.

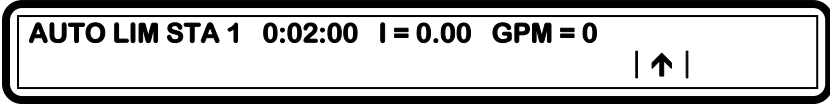


Figure 187: Auto Limits

In addition to sequencing through all stations, MV1, MV2 and the N.O. output currents are also established.

Note: The pump is not calculated and therefore should be established by the user manually.

When completed, the Auto Limits Options menu will be displayed.

Step 4 This completes the Auto Limits procedure.

Press the QUIT key to return to the base screen.

Enabling and Disabling Current Checking

After maximum and/or minimum current limits are entered, current checking (monitoring) must be enabled for upper and lower limit detection.

Procedure

Step 1 Advance to the Current Limit Options screen as follows:



F1=Main Menu
F5=Setup
F3=Stations
F1=Enable/Disable
F2=Current



Figure 188: Current Limit Options

- Step 2** Select Upper Limit. The limit checking status (enabled or disabled) is displayed.



Figure 189: Upper Limit Enable Option

Using the F1=CHANGE OPTION toggle key, enable/disable the Upper Limit check.

- Step 3** Press the Up Arrow and select the F2=LOWER LIMIT. Enable the Lower Limit check using the F1=CHANGE OPTION toggle key.

If a limit check (upper or lower) is disabled, current checking for that station is not performed and condemnation and reporting of stations violating that limit does not occur.

Station Current Limit Setup

The maximum current limit is used to detect shorted solenoid wiring or a faulty solenoid. A minimum limit value, equal to 50% of the measured station current, is used to detect an open or broken wire.

Current Limit Setup Procedure:

Step 1 Advance to the Limit Options menu as follows:



F1=Main Menu
F5=Setup
F3=Stations



Figure 190: Limit Options

Step 2 Select F2=LIMITS/TYPE and enter the station number. The station number must be between 1 and 48.

Note: The maximum number of stations is determined by the total stations configured in the satellite controller. The maximum number will appear on the Station Number Entry Display screen.

If the control output is for a Master Valve or Pump, enter the appropriate number from the following listing:

- 01 = MV1
- 02 = MV2
- 03 = N.O. MV
- 04 = Pump

Press the ENTER key.

- Step 3** Select F1=CURRENT LIMIT. The following screen is displayed:



STATION # # MAX CURRENT LIMIT: 1.00
ENTER LIMIT (0.0 - 1.0 AMPS) | ↑ |

Figure 191: Current Limit Entry

The Station Number is displayed with a Max Current value. If a Master Valve/Pump was entered, it will be indicated as such in the station number area.

- Step 4** Enter the maximum current limit in Amps then press ENTER. The limit must be between 0 (zero) and 1.0 Amps. The default maximum limit is 1.0 Amps. The controller compares the station's AC current consumption to the station maximum limit. If, after the station is turned on, the measured current consumption is larger than the limit, an error condition is detected. The suggested maximum current limit is 20% above normal operating current consumption.
- Step 5** Enter the minimum current limit in Amps. The limit must be between 0 (zero) and 1.0 Amps. The default minimum current limit is 0.05 Amps. The controller compares the station's AC current consumption to the station minimum limit. If, after the station is turned on, the measured current consumption is less than the limit, an error condition is detected. A value of 0 (zero) indicates the station is **not** checked for minimum current violations. The suggested minimum current limit is 50% of the normal operating current consumption. Enter a relatively small, non-zero minimum limit to detect an open or broken wire. Press ENTER.

Example Current Limit Violations

Station Consumes Too Much Current

Assume the maximum station current for station 7 is set to .60 Amps. While watering on Station 7 (no Pump, Master Valve or other stations on) is in progress, .85 Amps of current are detected. Watering is stopped on Station 7. The base menu will now display F2=WARNING and an entry is made in the warning list.

See "Maximum Controller Current" section for additional details.

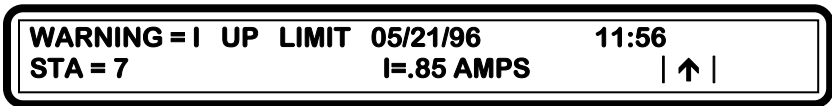


Figure 192: Warning, Up Limit

Station Consumes Too Little Current

Assume the minimum limit is set to 0.15 Amps. While watering on Station 2 is in progress, 0.00 Amps is detected. Watering on Station 2 is stopped. The base menu will now display F2=WARNING and an entry is made in the warning list.

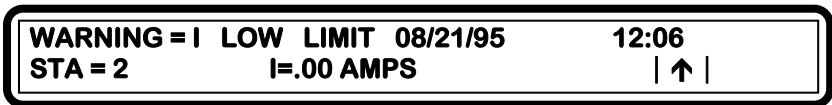


Figure 193: Warning, Low Limit

Multiple Stations with Non-Overlap Protection

The Evolution DX2 controller allows several stations to be on simultaneously. When current limit checking is used in this

The message will appear in the upper left corner over any given display screen.